

CHP for FDA's new White Oak Campus



in the Fast Lane !



August 17-20, 2003

www.energy2003.ee.doe.gov

2

Demonstrate use of Alternative Financing to integrate Combined Heating & Power into a Federal new construction project

August 17-20, 2003

www.energy2003.ee.doe.gov

3

- Introduce General Concepts re: Energy Savings Performance Contracting and CHP application in new construction scenario
- Relate specific concepts applied to Federal Research Center at White Oak project

August 17-20, 2003

www.energy2003.ee.doe.gov

4

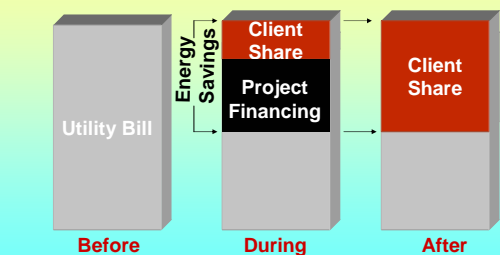
- Capital Budget Challenges
 - Limited Funding
 - Lengthy Approval Process
 - Functional Scope Creep
 - Energy Item Vulnerability
- Enhance Energy Performance of newly constructed buildings

Congressional Appropriations

August 17-20, 2003

www.energy2003.ee.doe.gov

5



Savings achieved via introduction of various Energy Conservation Measures (ECMs)

August 17-20, 2003

www.energy2003.ee.doe.gov

6



Concepts Savings Identification

- Model baseline condition
- Value engineer design from energy standpoint
- Model energy efficient design

$$\text{Energy } \$_{\text{base}} - \text{Energy } \$_{\text{eff}} = \text{Level of Alternative Financing Available}$$

August 17-20, 2003

www.energy2003.ee.doe.gov

7



Concepts Baseline Development

- Current design for new building
- ASHRAE 90.1 standards
- Energy performance of current location
- Typical, recent experience of GSA
- Combination of above

Whatever is agreeable; needs to withstand audit!

August 17-20, 2003

www.energy2003.ee.doe.gov

8



Federal Research Center White Oak Silver Spring, Maryland

August 17-20, 2003

www.energy2003.ee.doe.gov

9



FRC White Oak Project Location



August 17-20, 2003

www.energy2003.ee.doe.gov

10



FRC White Oak Revised Development Schedule

PHASE	BUILDING NAME/GROUP	GROSS SQ FT	OCCUPANCY DATE
1	CDER LAB	129,000	Oct-2003
2	CDER OFFICE	554,000	Jan-2005
3	SHARED USE (Phase 1)	122,000	Mar-2005
3	CDER OFFICE EXPANSION	367,000	Apr-2006
3	CDRH LAB	128,000	Sep-2006
3	CDRH OFFICE	373,000	Dec-2006
3	LOGISTICS Bldg	141,000	Apr-2006
3	DAY CARE	21,000	Dec-2005
4	SHARED USE (Phase 2)	61,000	Jan-2007
4	CDER LABS	303,000	Nov-2008
4	CDER LAB EXPANSION	75,000	Mar-2008
4	CDER OFFICE	133,000	Nov-2007
4	CDER OFFICE EXPANSION	105,000	Apr-2008
5	BUILDING ONE Renovation	90,000	Jan-2007
5	OC & ORA	357,000	Nov-2008
6	CVM OFFICE	123,000	Nov-2009
	Build-out	3,082,000	

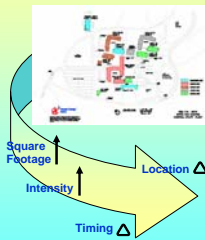
August 17-20, 2003

www.energy2003.ee.doe.gov

11



FRC White Oak Site Development



Dynamic Program !



August 17-20, 2003

www.energy2003.ee.doe.gov

12




FRC White Oak Project Features

- Combined Heating and Power for White Oak Campus
- Energy Conservation Measures....includes Photovoltaic element
- Cost Avoidance/One time Ancillary Savings
- Sempra provided Operations & Maintenance Services

August 17-20, 2003

www.energy2003.ee.doe.gov

13



FRC White Oak Total Savings Make-up

- One Time Ancillary Savings
 - Avoided demolition costs
 - Avoided construction costs
 - Avoided temporary heating and cooling costs
- Annual Savings
 - Energy savings
 - O&M savings

August 17-20, 2003

www.energy2003.ee.doe.gov

14



FRC White Oak Project Financials

- Capital Cost **\$27.5M**
- Annual Energy Savings **\$ 1.4M**
- Annual O&M Savings (net, 3rd year value) **\$ 1.1M**
- Total Annual Savings (net) **\$ 2.5M**
- Simple Payback 6.7 Years
- Capital Cost Available from Savings **\$28.7M**
 - 20 years @ 8.1%
- Required Construction Cost Savings (including avoided demolition) **\$ 0**

August 17-20, 2003

www.energy2003.ee.doe.gov

15



FRC White Oak Energy Conservation Measure Savings

•Photovoltaic	\$ 2,842
•Central Plant Improvements (CHP)	\$ 1,040,000
•Lighting Upgrade	\$ 41,849
•Glazing Upgrade	\$ 54,800
•AHU Redesign	\$ 158,011
•VFD on Pumps	\$ 46,757
•Economizer Cycle	\$ 18,443
•Demand Controlled Ventilation	\$ 18,783
•Night Setback	\$ 42,914
Total Energy Savings	\$ 1,424,400

August 17-20, 2003

www.energy2003.ee.doe.gov

16



FRC White Oak Combined Heating & Power System

- Baseline:
 - Pepco GT 3A Primary Rate, 2-500-ton and 2-1700-ton chillers
 - Constant speed motors on chilled water pumps, condenser water pumps, and cooling towers
 - Steam Heating
 - Chilled water ΔT of 12 °F and Condenser water ΔT of 10 °F
- Proposed:
 - Engine driven generator, 1 1130-ton absorption and 2 1130-ton electric chillers
 - Variable speed drives on all pumps and cooling towers
 - Hot Water Heating
 - Chilled water ΔT of 20 °F and Condenser water ΔT of 15 °F
- Savings: \$1,040,000 (annually, first year figure)
- Remarks: Electric Steam Boilers to be installed in buildings

August 17-20, 2003

www.energy2003.ee.doe.gov

17



FRC White Oak Energy Security

- 5.8 MW Engine-Generator
 - Dual Fuel
 - Primary Power Source
- Underground Electrical Distribution System
- Interconnection with Electric Grid
 - Two separate feeders into substation
- 2 MW Standby Diesel Generator

August 17-20, 2003

www.energy2003.ee.doe.gov

18

2003 FRC White Oak Energy Equipment Layout

August 17-20, 2003 www.energy2003.ee.doe.gov 19

2003 FRC White Oak Energy Optimization

Initial Approach: Near-continuous operation of engine-generator

Current Strategy: Real-time “make or buy” decision based upon cost of natural gas, electric tariff, campus loads vs. engine & cogen efficiencies, etc.

Bottom Line: Sempra, GSA and tenants work in partnership to operate the facility in the best interests of the Government

August 17-20, 2003 www.energy2003.ee.doe.gov 20

2003 FRC White Oak Energy Permits, etc.

August 17-20, 2003 www.energy2003.ee.doe.gov 21

2003 FRC White Oak Energy Non-ESPC Stuff

AF Campus

Central Utilities Plant

Substation Revitalization

Historic Preservation of old Firehouse

Campus Building Commissioning

Consultant for Gas & Electric Procurement

FDA Campus

Metropolitan Services Division & Energy Center of Expertise

August 17-20, 2003 www.energy2003.ee.doe.gov 22

2003 FRC White Oak Energy Lessons Learned

- ESPC training for key personnel early in process
- Greater level of design desirable in comparison to traditional ESPC during DES phase
- Management Reserve for unforeseen circumstances & procedures for use
- Develop notional utilities budget for facilities operation as part of DES
- Specify timeframe/vehicle for work outside ESPC scope

August 17-20, 2003 www.energy2003.ee.doe.gov 23

2003 FRC White Oak Energy ESPC Development Timeline

- Concept proposed to GSA: Oct 01
- Initial proposal submitted: Jan 02
- Final proposal submitted: Mar 02
- Delivery Order awarded: Jul 02
- CUP Operational (minus CoGen): Oct 03
- Enter ESPC Performance Phase: Jan 04

August 17-20, 2003 www.energy2003.ee.doe.gov 24

- Reduced first-cost to Government
- Reduced recurring costs to Government
- More energy efficient campus
- Fixed accountability for systems performance
- ***Enhanced Energy Security***

Questions ?

✦ **US Food & Drug Administration:** Ernest Lunsford
PH: 301-827-1001 - e-mail: ernest.lunsford@fda.gov

✦ **General Services Administration:** Harry Debes
PH: 202-260-9583 - e-mail: harry.debes@gsa.gov

✦ **General Services Administration:** James Watson
PH: 202-219-3115 - e-mail: james.watson@gsa.gov

✦ **Sempra Energy Solutions:** Phil Smith
PH: 770-632-0672 - e-mail: psmith@semprasolutions.com